

Proton Driver

“Prototype” Recommendations

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Caveats and Disclaimers

- **I will show “prototype recommendations” from the Proton Driver working group. What do I mean by that???**
- **What they are:**
 - These are the recommendations that the Proton Driver working group will make to the full LRP committee.
 - We have not yet discussed these recommendations with the full LRP committee, nor has the full committee attempted to balance these PD recommendations vs. other recommendations it might make.
- **What they are not:**
 - Final recommendations that have been “approved” or “endorsed” by the full LRP committee in any way.
- **As such these recommendations should be thought of as the current thinking of the Proton Driver working group which we present today to the larger FNAL community to provoke discussion and comment.**

“Prototype” Recommendation 1

The physics of neutrino oscillations is compelling. The Fermilab Main Injector, NUMI beam line, and the MINOS detector are unique Fermilab assets that can be brought to bear on these questions but new long baseline neutrino experiments are needed to understand the underlying physics. These experiments require an intense proton source. Such a source would also support a broad range of other physics programs. The intensity requirements of these experiments are beyond those achievable with feasible upgrades to Fermilab’s aging Linac and Booster complex.

- We recommend that Fermilab adopt as its next accelerator construction project the creation of a 1-2 MW proton source (aka Proton Driver). We envision this project to be a coordinated combination of upgrades to existing machines and new construction. We believe this recommendation to be valid in any plausible linear collider scenario.**

“Prototype” Recommendation 2

A new proton synchrotron or superconducting linac fed by a new copper linac and combined with changes to the Main Injector can provide the required proton source. There are many technical overlaps between the development and construction of a superconducting linac based Proton Driver and a cold technology Linear Collider. The use of SCRF in a Proton Driver also opens up a variety of other possible SCRF applications and technical collaborations at Fermilab.

- We recommend that Fermilab adopt a superconducting 8 GeV linear accelerator as the preferred option to replace the existing Linac-Booster system.**

“Prototype” Recommendation 3

Providing a new proton source in a timely fashion requires an urgent commitment of resources. We believe that commitment of the necessary resources at this time can be consistent with existing laboratory commitments to Run II and to other projects.

- We recommend that Fermilab create a group charged to submit to DOE documentation sufficient to achieve a statement of mission need (CD-0). The group will elaborate the physics case, produce a Technical Design Report, prepare project management documentation including cost and schedule estimates, and prepare a plan for the required R&D.**

Discussion

- **Concern: Support for a Proton Driver may have an adverse effect on Run II, BTeV, or other ongoing FNAL projects.**
 - If we do it right, it probably will....
 - but the net negative effect will be small. The approximate number of people needed for PD over the next year or two is about 20 FTE. We imagine about half of these are working on Run II in BD, the other half in TD on SCRF & other engineering projects.
 - This is a small % hit, there is always a cost to plan for the future
 - The positive effects for lab personnel and the FNAL user community are significant:
 - Maintains an exciting Physics Program at the lab independent of the uncertainties associated with the Linear Collider
 - Allows FNAL to pursue interesting accelerator options and develop a new “enabling” technology (SCRF)

Discussion

- **There are many LC scenarios**
 - On shore vs. Off shore
 - Warm vs. Cold technology
 - Time scale
 - technically limited
 - funding limited
 - organizationally limited (i.e. international agreements set time scale)
- **PD & LC LRP subcommittees have spent lots of time discussing these.**
- **There are many opinions and viewpoints.**
- **The Oct 23 Linear Collider subcommittee open session will presumably provide more detail on possible scenarios.**
- **However, given:**
 - the scale of the PD Driver Project (factor of 10-25 smaller than the LC)
 - the need to have a viable physics program at FNAL in any scenario
 - ==> we think a new Proton Source should proceed in any of these variations, and not be held “hostage” to uncertain LC time scales or the LC technology choices.

General Discussion

- **This is your chance to make your views known!**